

BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 6

DECEMBER 1961

PART 4

INSTITUTE NEWS

Spring Meeting, London, 20-22 March 1962

The 1962 Spring Meeting of the Institute will be held at Church House, Great Smith Street, London, S.W.1, on 20-22 March.

The main features of the programme are given below; a complete programme will appear later.

Tuesday, 20 March

- 10.30 a.m. Annual General Meeting.
Presidential Address by the Earl of Verulam.
- 2.30 p.m. *Session A*
Symposium on "Uranium and Graphite",
arranged by the Nuclear Energy Committee.
- Session B*
Discussion on "Structural Aspects of High-Strain-Rate Deformation", arranged by the Metal Physics Committee.
- 6.00 p.m. May Lecture.

Wednesday, 21 March

- 10.00 a.m. *Session A*
Symposium on "Uranium and Graphite" (*continued*).
- Session B*
Discussion on three papers, already published in the *Journal*, dealing with engineering metallurgy.
- 2.30 p.m. *Session A*
Symposium on "Uranium and Graphite" (*concluded*).
- Session B*
Discussion on three papers, already published in the *Journal*, dealing with properties of materials.
- Evening Conversation at 17 Belgrave Square, London, S.W.1.

Thursday, 22 March

- 10.00 a.m.-5.00 p.m. Symposium on "Electron-Probe Micro-Analysis", arranged by the Metal Physics Committee.
- Evening Dinner and Dance at Grosvenor House, Park Lane, London, W.1.

Election of Members to Fill Vacancies on the Council in 1962-63

In accordance with the Institute's Articles of Association, certain Members of Council retire at the Annual General

Meeting each year. At the 1962 Annual General Meeting the following will retire: Professor H. O'NEILL (*President*); Dr. L. B. PFEIL (*Past-President*); Professor H. FORD and Mr. E. H. JONES (*Vice-Presidents*); and Dr. L. B. HUNT, Lord KIRKWOOD, and Mr. F. W. TOMLINSON (*Ordinary Members*).

Under Article 19, Professor H. O'NEILL, M.Met., D.Sc., F.I.M., will fill the vacancy on the Council as *Past-President*.

The following members have been elected to fill the vacancies and will take office at the Annual General Meeting on 20 March 1962.

As President

The Right Hon. The Earl of VERULAM, Chairman and Managing Director of Enfield Rolling Mills, Ltd.

As Senior Vice-President

Professor H. FORD, D.Sc.(Eng.), Ph.D., M.I.Mech.E., M.I.C.E., Professor of Applied Mechanics, Imperial College of Science and Technology, University of London.

As Vice-Presidents

L. B. HUNT, M.Sc., Ph.D., A.R.C.S., F.R.I.C., F.I.M., Manager (Industrial Division), Johnson, Matthey and Co., Ltd.

L. ROTHERHAM, M.Sc., F.Inst.P., F.I.M., Member for Research, Central Electricity Generating Board.

As Ordinary Members of Council

S. E. CLOTWORTHY, B.Sc., Managing Director, Alcan Industries, Ltd.

L. GRAINGER, B.Sc., A.I.M., Assistant Director, Atomic Energy Research Establishment, Harwell.

N. P. INGLIS, Ph.D., M.Eng., M.I.Mech.E., F.I.M., Research Director, Imperial Chemical Industries, Ltd., Metals Division.

International Conference on "The Metallurgy of Beryllium"

The conference on "The Metallurgy of Beryllium" organized by the Nuclear Energy Committee of the Institute took place in London, as arranged, on 16-18 October.

The conference—believed to be the first international one on beryllium—proved very successful, being attended by over 300 persons; 13 countries other than Great Britain were represented.

Seventy papers were presented and these, with an account of the discussion, will be published in a volume of proceedings of the Conference next year.

PERSONAL NOTES

There were two social functions in connection with the Conference—a cocktail party on the first evening and a dinner at the end of the meeting. Both were well attended and contributed to the success of the Conference as a whole.

"Elements of Structural Metallurgy"

A new monograph by Professor W. Hume-Rothery—"Elements of Structural Metallurgy"—has just been published by the Institute.

Professor Hume-Rothery is the author of two very successful books for students in the Institute's Monograph and Report Series. One of these—"The Structure of Metals and Alloys"—first published in 1936, has been frequently revised (latterly in conjunction with Professor G. V. Raynor) and has grown considerably in size in the process.

"Elements of Structural Metallurgy" represents a much shorter treatment than is now given in "The Structure of Metals and Alloys" and one which is at a more elementary level. In his new monograph Professor Hume-Rothery has avoided summarizing his earlier books and has attempted a fresh presentation of the material in a form suitable for use in technical colleges and universities.

Copies may be obtained from the Institute or through booksellers. The price through the Institute is 17s. 6d. to members and 25s. to non-members, post free in each case.

"Metallurgical Reviews": Subscriptions for 1962

Owing to the recent increase in printers' charges and postal rates, it has been found necessary to raise the price of *Metallurgical Reviews*. As from Vol. 7, 1962, the annual subscription rates will be:

| | Members | Non-Members |
|---|---------|-------------|
| Four issues (with binding case) | £2 0 0 | £3 0 0 |
| Bound volume | £2 10 0 | £3 10 0 |

Postage is included in all cases.

Election of Members

The following 16 Ordinary Members, 2 Junior Members, and 5 Student Members were elected on 26 October 1961:

As Ordinary Members

- BOWCOTT, John Edward Llewellyn, B.Sc., Ph.D., A.R.I.C., Group Leader, Beryllium Development Department, Imperial Smelting Corporation, Ltd., Avonmouth.
- CRAIG, William Nicholas, B.Sc., Personnel and Education Officer, Research Laboratories of The British Aluminium Co., Ltd., Gerrards Cross, Bucks.
- GEORGE, Thomas Frederick Richard, B.Sc., Chief Inspector, Fairey Engineering, Ltd., Heston, Middlesex.
- KATSURA, Kanichiro, General Manager, Technical Operation and Research Department, Nippon Kokan Kaishiki Kaisha (Japan Steel and Tube Corporation), Tokyo, Japan.
- KIDDLE, Peter Reginald, Assistant Sales Manager, Davy and United Engineering Co., Ltd., Sheffield 9.
- KIRK, William Archibald, Plant Metallurgist, Light Alloys Ltd., Haley, Ont., Canada.
- MONTAGU, Walter Bernard St. John, Director, Charles Henderson and Co., Ltd., Glasgow, C.2.

- POCHAT, Michel Jean Marie, Ing., Director, Usine de Boisthorel Rai (Orne), France.
- POLLOCK, William, L.I.M., Metallurgist, H. Rollet and Co., Ltd., 6 Chesham Place, London, S.W.1.
- REES, Joseph Norman, Managing Director, Wellman Crane and Machine Co., Ltd., London, S.W.1.
- ROYCHOWDHURY, Kali Pada, B.Sc., M.Sc., Works Manager, The Eyre Smelting (Private) Ltd., Tandem Works, Calcutta, India.
- SCOULLER, Joseph, Director, Charles Henderson and Co., Ltd., Glasgow, C.2.
- SPOONER, Norman Francis, B.S.E., Manager, New Product Planning and Development Department, Hoskins Manufacturing Co., Detroit 8, Mich., U.S.A.
- TAYLOR, Walter, Director, Northern Diecasting Co., Ltd., Burnley, Lancs.
- WILLIAMS, Emlyn, B.Sc., Technical Officer, Associated Electrical Industries, Ltd., Chichester House, London, E.C.1.
- ZOCCHI, Ampelio, Superintendent, Remelt Department, Aluminio do Brasil S.A., Utinga-Ste. André, São Paulo, Brazil.

As Junior Members

- DALLEY, Clive Leonard, Dip.Tech., Metallurgist, Enfield Rolling Mills, Ltd., Brimsdown, Enfield, Middlesex.
- VERNON, John Stuart, B.Sc., Assistant Metallurgist, Process Control Department, Thomas Bolton and Sons, Ltd., St. Helens, Lancs.

As Student Members

- BROOMFIELD, Robert Walter, Student, University of Birmingham.
- DARBY, Robert Alan, Trainee, British Insulated Callenders Cables, Ltd., Prescott, Lancs.
- EVANS, Russell W., Research Student, Metallurgy Department, University College, Swansea.
- JENKINSON, Richard George, Assistant to Managing Director, W. G. Jenkinson, Ltd., Sheffield 1.
- O'BOYLE, Dennis, B.S.M.E., Materials Engineer, A. C. Spark Plug Division, General Motors Corp., Milwaukee 1, Wis., U.S.A.

PERSONAL NOTES

DR. W. O. ALEXANDER, Assistant Research Manager of Imperial Chemical Industries, Ltd., Metals Division, has been appointed Technical Director of Foseco International, Ltd., Birmingham, with effect from 1 January 1962.

DR. C. R. CUPP has left Atomic Energy of Canada, Ltd., to join The International Nickel Co., Inc., Bayonne, N.J.

DR. C. EDELEANU has left Tube Investments Research Laboratories and is now in the Engineering Developments Department, Imperial Chemical Industries, Ltd., Billingham Division, Billingham, Co. Durham.

MR. K. LONG has been appointed Foundry Superintendent at the Redditch Works of The British Aluminium Co., Ltd.

MR. J. E. MCLENNAN, of Newcastle University College, Australia, will be on sabbatical leave in England from January 1962 to January 1963. During this period his address will be: Department of Metallurgy, Pembroke St., Cambridge.

OTHER NEWS

DR. S. MOCARSKI has left the Canadian General Electric Company to become Manager of Chemical and Metallurgical Operations at the Ford Motor Company of Canada, Ltd., Windsor, Ont.

Death

The Editor regrets to announce the death of:

MR. ESSINGTON LEWIS, of Melbourne, on 2 October 1961.

JOINT ACTIVITIES

The Beilby Medals and Prizes 1961

Awards of Beilby Medals and Prizes for 1961 to Dr. C. Edeleanu and Professor J. Nutting were made by the President (Professor H. O'Neill) at a cocktail party held at the Institute of Metals on 23 October. The ceremony was attended by representatives, including the Presidents, of the three societies jointly responsible for the awards (the Royal Institute of Chemistry, the Society of Chemical Industry, and the Institute of Metals). The awards were announced on p. 194 of the August issue of the *Bulletin*.

LECTURES TO LOCAL SECTIONS & ASSOCIATED SOCIETIES

High-Temperature Alloys

At a meeting of the Oxford Local Section held on 3 October, Dr. W. BETTERIDGE (The International Nickel Company (Mond), Ltd.) gave a lecture on "High-Temperature Alloys".

Dr. Betteridge dealt with the selection of materials for high-temperature service based on their resistance to corrosion by the surrounding medium, their strength, and economic considerations. He said that resistance to atmospheric corrosion at elevated temperatures was normally given by a protective oxide scale formed from the constituents of the alloy, although, for use at extreme temperatures, a protective metallic or ceramic coating might be applied to materials, e.g. molybdenum and its alloys, which would otherwise be insufficiently resistant. The inherent resistance to oxidation of the noble metals permitted their use in certain conditions, although even metals of the platinum group lost weight slowly at extremely high temperatures owing to volatility of the oxides or of the metals themselves.

The importance of adequately keying a protective scale to the underlying metal was illustrated, and the influence of minor elements in modifying the keying action was described. Specific corrosion effects of elements normally not present in the atmosphere but which occurred under industrially important conditions, were described. Carbon, vanadium, and sulphur were particularly mentioned in this context, and the effect of glass in dissolving protective oxides was dealt with.

The importance of structure in controlling mechanical properties at elevated temperatures was illustrated by reference to the precipitation-hardened nickel-chromium alloys. The relation between tensile proof stress and creep strength at increasing temperatures provided a basis for an introduction

to the use of creep data for design purposes. Other mechanical-strength characteristics, such as impact and fatigue strength, were discussed in relation to creep strength and to the influence of heat-treatment on these properties.

The limits of existing materials were considered in the light of possible developments along conventional lines, and current research work aimed at developing improved alloys was described. The lecturer said that greatest promise appeared to lie in the use of dispersion-hardening by inert phases in the place of precipitation-hardening. These possibilities were illustrated by results obtained on nickel and nickel-base alloys hardened with thorium and on platinum and platinum-rhodium alloys hardened by a similar mechanism.

Creep

On 13 October, Dr. D. MCLEAN (National Physical Laboratory) lectured to the West of England Metallurgical Society on "Creep: The Potential Influence of Theory in Practice".

The lecture was similar in substance to one which Dr. McLean gave to the Liverpool Metallurgical Society earlier in the year and of which a summary was published in the June issue of the *Bulletin* (p. 184).

OTHER NEWS

Deutsche Gesellschaft für Metallkunde

The 1962 meeting of the Deutsche Gesellschaft für Metallkunde will be held in Munich on 19-22 June.

Conference on "Diffusion and Mass Transport in Solids"

The Institute of Physics and The Physical Society announces that it is arranging a conference on "Diffusion and Mass Transport in Solids" to be held in the University of Reading on 10 and 11 April, 1962. A number of papers have been promised and further contributions will be considered. It is provisionally proposed to hold sessions on general theoretical aspects of diffusion in solids and on diffusion and related mass-transfer phenomena in metals, in oxides and covalent materials, and in strongly ionic solids.

Correspondence regarding the programme should be addressed to Dr. B. L. Evans, J. J. Thomson Physical Laboratory, Whiteknights Park, Reading, Berks.

The conference will be residential and the numbers will be limited. Further particulars and application forms will be available in January 1962 from the Administration Assistant, The Institute of Physics and The Physical Society, 47 Belgrave Square, London, S.W.1.

International Conference on Fracture

An International Conference on Fracture, sponsored by A.I.M.E., will be held in the Seattle area in the week of 20 August, 1962. The aim of the conference will be to bring as many different types of view to bear on fracture as is practical in the time available. Papers will be of two types: surveys of different areas of interest (continuum mechanics, microstructural, atomistic, and environmental) and current research papers. Although the majority of papers will be invited, there may be room for submitted papers in the above areas. Anyone interested in submitting a paper should communicate

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with Dr. H. Brunner, Programme Chairman, Boeing Scientific Research Lab., P.O. Box 3981, Seattle 24, Wash. It would help the overall planning if anyone interested would send a percentage probability of attending to the General Chairman, Professor H. W. Paxton, Carnegie Institute of Technology, Pittsburgh 13, Pa.

DIARY

19 December. Birmingham Local Section. "Science in the Service of Metallurgical Industry", by H. Morrogh. Christmas Lecture for Schoolchildren. (Large Lecture Theatre of the Birmingham and Midland Institute, Paradise Street, Birmingham, at 2.30 p.m.)

1962

4 January. London Local Section. "New Methods of Power Generation", by K. M. Spring. (17 Belgrave Square, London, S.W.1, at 6.30 p.m.)

9 January. Oxford Local Section. "Selling a Metal—The Technical Aspects of Developing New Outlets", by M. Bridgewater. (Cadena Café, Cornmarket Street, Oxford, at 7.15 p.m.)

9 January. Tyne Wear Metallurgical Association. "Some Aspects of Electrochemical Corrosion", by Dr. T. P. Hoar. (Metallurgy Department, King's College, Haymarket, Newcastle-upon-Tyne 1, at 6.30 p.m.)

11 January. Birmingham Local Section. "Some New Bearing Metals", by P. G. Forrester. (College of Advanced Technology, Gosta Green, Birmingham 4, at 6.30 p.m.)

11 January. East Midlands Metallurgical Society. "New Metals", by Mrs. M. K. McQuillan. (Derby and District College of Art, Green Lane, Derby, at 7.30 p.m.)

LECTURE COURSE

BATTERSEA COLLEGE OF TECHNOLOGY: Department of Physics. A course of ten lectures on "Dislocation Theory", to be held on Thursdays, at 6.30 p.m., commencing 11 January, 1962. The course is suitable for graduates in Physics, Metallurgy, Mathematics, and Chemistry. Fee £1 os. od. Enrolment forms and further details may be obtained from the Secretary (Dislocation Theory Course), Battersea College of Technology, London, S.W.11.

APPOINTMENTS VACANT

UNIVERSITY OF MELBOURNE

Senior Lecturer in Physical Metallurgy

Applications are invited for the above-mentioned position. Applicants should possess an honours or higher degree in science or engineering and should have had teaching and/or research experience in the field of physical metallurgy. Duties will include lectures and supervision of laboratory classes for second, third, and fourth year engineering and science students.

The salary range is £A2,450 to £A3,000 per annum. Superannuation similar to F.S.S.U. in Great Britain will be provided.

Further information may be obtained from the Secretary, Association of Universities of the British Commonwealth (Branch Office), Marlborough House, Pall Mall, London, S.W.1.

Applications close on 15 December, 1961.

U.S.A. RESEARCH FOUNDATIONS

Applications invited for posts in the following fields:

**MATERIALS RESEARCH
PHYSICAL METALLURGY
PROCESS METALLURGY
STRESS ANALYSIS
EXPERIMENTAL MECHANICS
CERAMICS**

Qualification: Higher degree plus research experience in an appropriate field.

Posts range from Assistant Research Engineer to Senior Scientist.

Applications: In confidence to, and further information from:

**G. HALL, M.A., B.Sc.
2 & 4 TUDOR STREET,
LONDON, E.C.4.**

FELLOWSHIPS AND ASSISTANTSHIPS available for advanced degree students interested in graduate study in the fields of metallurgy and ceramics. Summer employment between academic years is assured. Research performed as an assistant can be used for a thesis. A new Materials Research Centre provides exceptional facilities for basic research and advanced studies in kinetics, physical ceramics and metallurgy, studies of imperfections in solids, electronic and magnetic behaviour, thermodynamics, X-ray diffraction, and electron microscopy. Applicants with degrees in mathematics, the physical sciences, or engineering and an interest in this field will be considered. Because of the quarter system, it is possible to start graduate studies at several times during the year. Department of Metallurgy and Materials Science, the Technological Institute, Northwestern University, Evanston, Illinois, U.S.A.